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ABSTRACT

This document contains three learning activity packets (LAPs) that outline the study activities for the instructional area of measuring for an Auto Mechanics I course. The three LAPs cover the following topics: rules, the outside micrometer, and the inside micrometer. Each LAP contains a cover sheet that describes its purpose, an introduction, and the tasks included in the LAP; learning steps (checklist); pretest; and various assignment sheets. Materials are illustrated with line drawings. The LAPs are referenced to a curriculum guide for the Auto Mechanics I course. (KC)

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ED279808

Learning Activity Packets (LAPs)

Auto Mechanics I

Section B — Measuring

LAP #8 — Rules
LAP #9 — The Outside Micrometer
LAP #10 — The Inside Micrometer

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State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO. _____ CODE: _____

MAJOR INSTRUCTIONAL AREA

MEASURING

INSTRUCTIONAL UNIT

RULES
SECTION B--UNIT I

LEARNING ACTIVITY PACKET NO.

8

PREREQUISITE LAP(S)

1, 2

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities for "Rules." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training.

INTRODUCTION: The course of study in this LAP will help the student become able to identify common types of rules, write the uses of rules with accessories, list general procedures for using rules, and list the common units of measure found on rules.

TASKS INCLUDED IN THIS LAP:

None

AUTO MECHANICS I
RULES
Section B--Unit I

LEARNING STEPS

Check the Following
Blanks as You Complete
The Required Steps.

_____1.	Read	Unit and Specific Objectives, page 1-B.
_____2.	Complete	Rules Pre-Test, LAP page 3.
_____3.	Study	The sections of the Information Sheet, pages 7-B through 31-B, indicated by your instructor on your Pre-Test. Be sure to refer to the Transparency Masters when required.
_____4.	Do	LAP Assignment Sheet #1, LAP page 9.
_____5.	Do	LAP Assignment Sheet #2, LAP page 15.
_____6.	Do	Assignment Sheet #1--Draw Lines, page 33-B.
_____7.	Stop.	Have your instructor evaluate Assignment Sheet #1. If your instructor is satisfied with your performance, proceed to Step 9. Otherwise, continue to Step 8.
_____8.	Do	LAP Assignment Sheet #3, LAP page 21.
_____9.	Do	Assignment Sheet #2--Measure Lines, page 35-B.

_____10. Stop. Have your instructor evaluate Assignment Sheet #2. If your instructor is satisfied with your performance, proceed to Step 12. Otherwise, continue to Step 11.

_____11. Do LAP Assignment Sheet #4, LAP page 23.

_____12. Do Assignment Sheet #3--Apply Line Measurement, page 37-B.

_____13. Stop. Have your instructor evaluate Assignment Sheet #3. If your instructor is satisfied with your performance, proceed to Step 15. Otherwise, continue to Step 14.

_____14. Do LAP Assignment Sheet #5, LAP page 25.

_____15. Do Assignment Sheet #4--Apply Circular Measurement, page 39-B.

_____16. Stop. Have your instructor evaluate Assignment Sheet #4. If your instructor is satisfied with your performance, proceed to Step 18. Otherwise, continue to Step 17.

_____17. Do LAP Assignment Sheet #6, LAP page 27.

_____18. Review Information Sheet (page 7-B).

_____19. Take Rules Unit I Test (see your instructor). If you score 85 percent or above, continue to the next Learning Activity Packet. If you do not score 85 percent or above, ask your instructor about additional study requirements and possible re-testing.

RULES
UNIT I

PRE-TEST

NAME_____ SCORE_____

DIRECTIONS: This test is to determine how much you already know about rules. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you know the answer. Guessing may prevent you from receiving the lessons which are required.

1. Match the terms on the right to the correct definitions.

_____a.	Mistake in the reading or total measurement	1. Reliable measure
_____b.	Starting point of measurement for both workpiece and rule	2. Error
_____c.	Marking found on rules and scales to denote unit of length	3. Graduation
_____d.	Accurate or true measurement	4. Reference point
_____e.	Semiprecision measuring instrument graduated in fractional or decimal parts of an inch	5. Steel rule

2. Name three basic units of measurement found on rules.

   a.

   b.

   c.

3. List four fractional units of measure found on rules.

   a.

   b.

   c.

   d.

4. List two decimal units found on rules.

   a.

   b.

5. List four metric units found on rules.

   a.

   b.

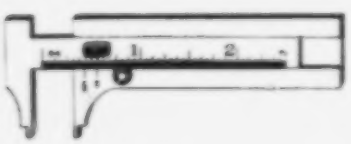
   c.

   d.

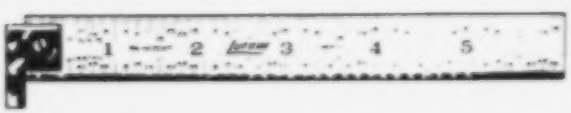
6. Identify the following types of rules.

   a._____

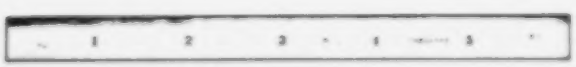
   b._____



   c._____



   d._____



e. _____

7. Write the uses of the following rules with accessories.

a.

_____

_____

_____

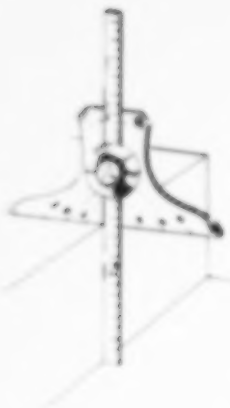
b.

_____

_____

_____

c.



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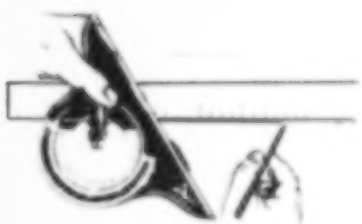
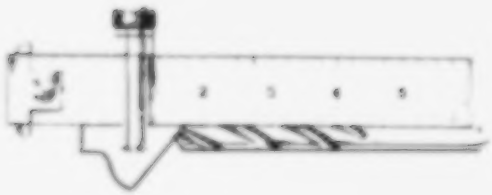
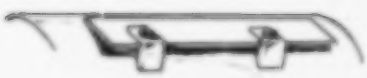


e.

f.



g.



8. List eight procedures for using rules.

a.

b.

c.

d.

e.

f.

g.

h.

9. List the four steps in reading the rule.

a.

b.

c.

d.

10. Stop. Have your instructor evaluate your test and mark the areas below which require additional study.

Refer to Information Sheet, Sections:

I_____ VI_____

II_____ VII_____

III_____ VIII_____

IV_____ IX_____

V_____

If any of the above study areas are checked, study those areas and then go to LAP Step 3. Otherwise, proceed to LAP Step 6.

RULES
UNIT I

LAP ASSIGNMENT SHEET #1--RULES

NAME_____ SCORE_____

1. Match the terms to the correct definition by choosing the definition which best identifies the term.

   1. Reference point:

      _____a. Starting point of measurement for both workpiece and rule.

      _____b. Marking found on rules and scales to denote unit of length.

      _____c. Semiprecision measuring instrument graduated in fractional or decimal parts of an inch.

   2. Reliable measure:

      _____a. Mistake in the reading or total measurement.

      _____b. Marking found on rules and scales to denote unit of length.

      _____c. Accurate or true measurement.

   3. Error:

      _____a. Mistake in the reading or total measurement.

      _____b. Starting point of measurement for both workpiece and rule.

      _____c. Semiprecision measuring instrument graduated in fractional or decimal parts of an inch.

   4. Graduation:

      _____a. Mistake in the reading or total measurement.

      _____b. Marking found on rules and scales to denote unit of length.

      _____c. Accurate or true measurement.

   5. Steel rule:

      _____a. Starting point of measurement for both workpiece and rule.

      _____b. Marking found on rules and scales to denote unit of length.

      _____c. Semiprecision measuring instrument graduated in fractional or decimal parts of an inch.

2. Name three basic units of measurement found on rules by crossing out the incorrect choices.

   a. Eccentric

   b. Fractional

   c. Decimal

   d. Bilateral

   e. Degree

   f. Metric

3. List four fractional units of measure found on rules by crossing out the incorrect choices.

   a. Hundredths

   b. Sixteenths

   c. Sixty-fourths

   d. Fifths

   e. Thirty-seconds

   f. Tenths

   g. Eighths

   h. Twenty-fourths

4. List two decimal units found on rules by crossing out the incorrect choices.

   a. Hundredths

   b. Tenths

   c. Fifths

   d. Eighths

5. List four metric units found on rules by crossing out the incorrect choices.

   a. Hexameter

   b. Decimal

   c. Millimeter

   d. Meter

   e. Millipede

   f. Decimeter

   g. Tachometer

   h. Centimeter

6. Identify the following types of rules by selecting the correct term from the list below.

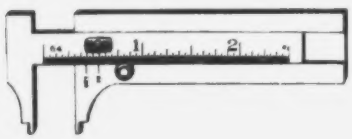
Hook rule

Steel rule

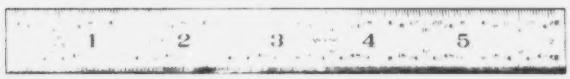
Short rule with holder

Narrow flexible rule

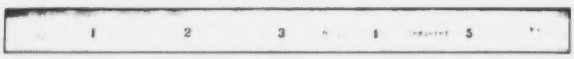
Slide caliper rule



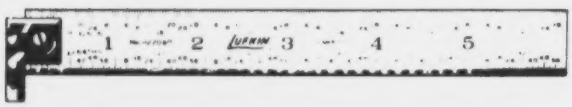
a. _____



b. _____



c. _____

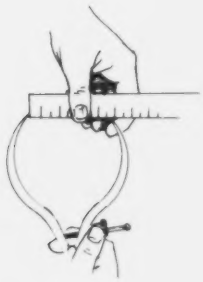


d. _____

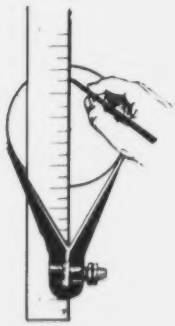
e. _____

7. Write the uses of the following rules with accessories by matching the correct use with each illustration.

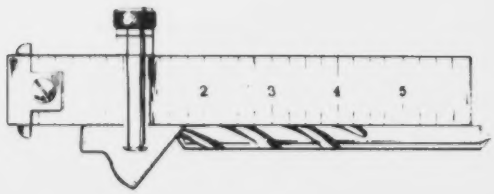
a._____



b._____



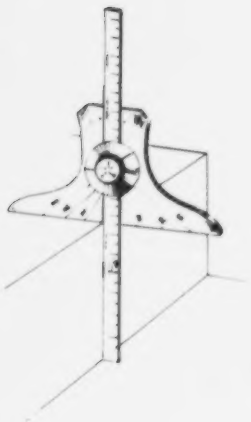
c._____



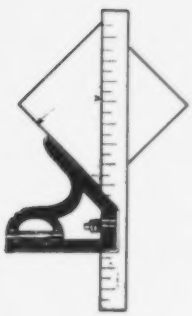
1. Locate parallel axis and width of key seats.
2. Lay out and measure lengths of any angle between 0° and 180°.
3. Measure lengths taken from dividers and calipers.
4. Measure length, drill point angle, and lip length of a drill bit.
5. Lay out and measure lengths from 90° and 45° angles.
6. Measure depths of grooves, recesses and shoulders.
7. Locate center points on round workpiece.

d._____

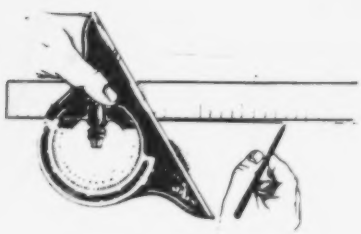
e._____



f._____



g._____



8. List eight procedures for using rules by completing the following sentences.

   a. Use the proper length and _____.

   b. Use the _____ graduation for accuracy.

   c. Use a _____ _____ rule.

   d. Do not _____ or distort a steel rule.

   e. Use rules only for their _____ _____.

   f. Use _____ unit graduation as a reference for accuracy.

   g. Use a rule on its _____ for a better reading.

   h. Use a rule along axis parallel/perpendicular to the plane of measurement. (Cross out the incorrect choice.)

9. List the four steps in reading the rule by completing the following sentences.

   a. Select a scale of the required _____.

   b. _____ the number of graduations.

   c. Count the _____ units.

   d. Reduce the graduations to the _____ _____.

10. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below which require additional study.

    Refer to Information Sheet, Sections:

    I____ VI____

    II____ VII____

    III____ VIII____

    IV____ IX____

    V____

    If any of the above study areas are checked, study those sections and then go to LAP Step 5. Otherwise, proceed to LAP Step 6.

RULES
UNIT I

LAP ASSIGNMENT SHEET #2--RULES

NAME_____ SCORE_____

1. Match the terms on the right to the correct definition.

_____a.	Mistake in the reading or total measurement.	1. Graduation
_____b.	Starting point of measurement for both wiorkpiece and rule.	2. Error
		3. Steel rule
_____c.	Marking found on rules and scales to denote unit of length.	4. Reference point
_____d.	Accurate or true measurement.	5. Reliable measure
_____e.	Semiprecision measuring instrument graduated in fractional or decimal parts of an inch.	

2. Name three basic units of measurements found on rules by completing the following words.

   a. F_____

   b. D_____

   c. M_____

3. List four fractional units of measure found on rules by completing the following words.

   a. E_____ c. Thirty_____

   b. S_____ d. Sixty_____

4. List two decimal units found on rules by completing the following words.

   a. T_____

   b. H_____

5. List four metric units found on rules by completing the following words.

   a. M_____

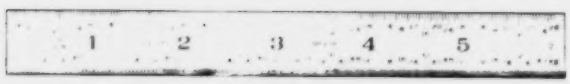
   b. D_____

c. C_____

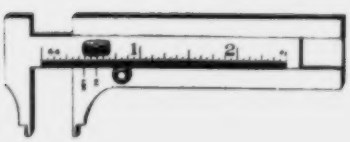
d. Milli_____

6. Identify the following types of rules.

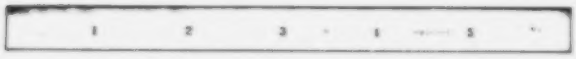
a._____



b._____

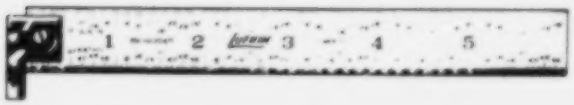


c. _____



d. _____

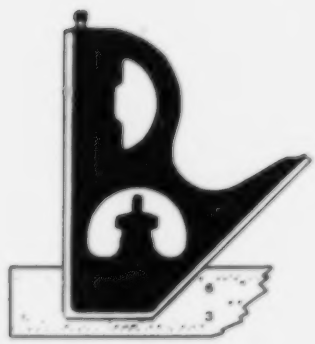
e. _____



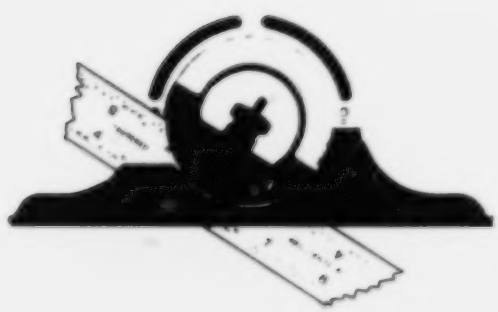
7. Write the use of the rules with accessories below by completing the following sentences.

a. Measure depths of _____, _____, and _____.

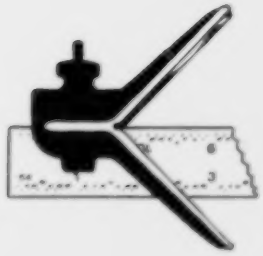
b. Lay out and measure lengths from _____° and _____° angles.



c. Lay-out and measure length of any angle between _____° and _____°.

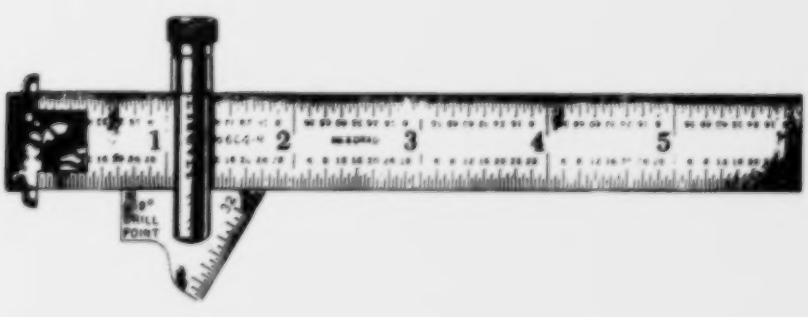


d. Locate _____ points on round workpiece.

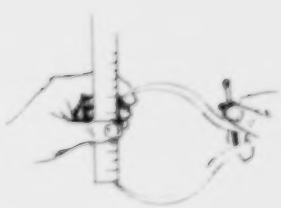


e. Locate _____ axis and width of _____ _____.

f. Measure length, drill point _____, and _____ length of a drill bit.



g. Measure lengths taken from _____ and _____.



8. List eight procedures for using rules by completing these sentences.

   a. Use the proper _____ and _____.

   b. Use the _____ _____ for _____.

   c. Use a _____ _____ rule.

   d. Do not _ _____ or _____ a steel rule.

   e. Use a rule only for its _____ _____.

   f. Use _____ _____ _____ as _____ for accuracy.

   g. Use a rule on _____ for _____ _____.

   h. Use a rule along _____ _____ to _____ of measurement.

9. List the four steps in reading the rule by completing the following sentences.

   a. Select _____

   b. Total _____

   c. Count _____

   d. Reduce _____

10. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to LAP Step 6. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 6.

RULES
UNIT I

LAP ASSIGNMENT SHEET #3--DRAW LINES

NAME_____ SCORE_____

DIRECTIONS: With the steel scale, draw straight lines of the following lengths in the space provided.

1. 2 3/8 inches
2. 1 1/2 inches
3. 3 3/4 inches
4. 4 3/16 inches
5. 37/64 inches
6. 1 7/8 inches
7. 4 19/32 inches
8. 3 1/4 inches
9. 2 31/32 inches
10. 4 5/8 inches
11. 1 3/64 inches
12. 2 7/16 inches
13. 5 1/8 inches
14. 3 51/64 inches
15. 1 9/16 inches
16. 4 27/32 inches
17. 2 33/64 inches
18. 3 15/32 inches
19. 4 11/16 inches
20. 1 17/32 inches
21. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to LAP Step 9. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 9.

RULES
UNIT I

LAP ASSIGNMENT SHEET #4--MEASURE LINES

NAME_____ SCORE_____

DIRECTIONS: Measure the following lines to the specified graduations. Reduce measures to the lowest terms and write your final answers on the lines.

1. Measure these lines to the nearest quarter of an inch.

   a. _____

   b. _____

   c. _____

   d. _____

2. Measure these lines to the nearest eighth of an inch.

   a. _____

   b. _____

   c. _____

   d. _____

3. Measure these lines to the nearest sixteenth of an inch.

   a. _____

   b. _____

   c. _____

   d. _____

4. Measure these lines to the nearest thirty-second of an inch.

   a. _____

   b. _____

   c. _____

   d. _____

5. Measure these lines to the nearest sixty-fourths of an inch.

   a.

   b.

   c.

   d.

6. Measure these lines to the nearest centimeter.

   a.

   b.

   c.

   d.

7. Measure these lines to the nearest millimeter.

   a.

   b.

   c.

   d.

8. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to Step 12. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to Step 12.

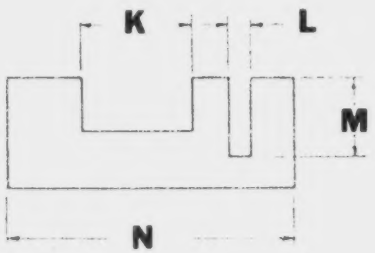
RULES
UNIT I

LAP ASSIGNMENT SHEET #5--APPLY LINE MEASUREMENT

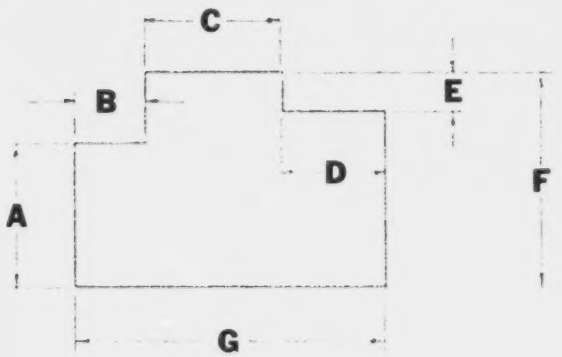
NAME_____ SCORE_____

DIRECTIONS: Use the rule to measure each lettered dimension on the drawings below. Use the finest graduations (64ths) on the rule and reduce each measure to its lowest terms. Write the measurement in the space beside the corresponding letter.

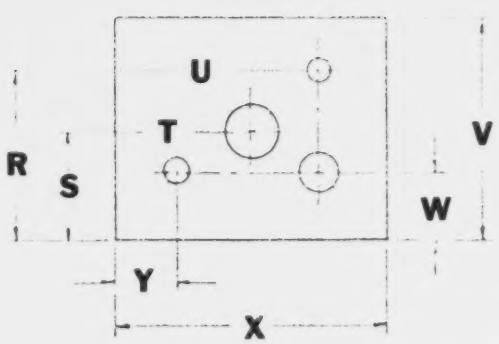
1. K. _____
   L. _____
   M. _____
   N. _____



2. A. _____
   B. _____
   C. _____
   D. _____
   E. _____
   F. _____
   G. _____



3. R. _____
   S. _____
   T. _____
   U. _____



V. _____

W. _____

X. _____

Y. _____

4. A. _____

B. _____

C. _____

D. _____

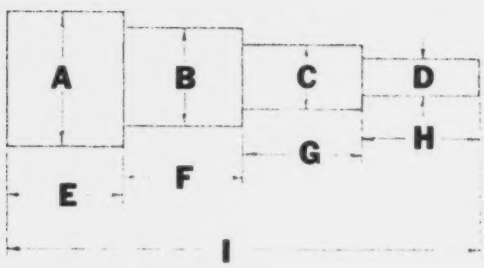
E. _____

F. _____

G. _____

H. _____

I. _____



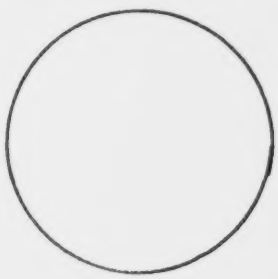
5. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to LAP Step 15. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 15.

RULES
UNIT I

LAP ASSIGNMENT SHEET #6--APPLY CIRCULAR MEASUREMENT

NAME_____ SCORE_____

DIRECTIONS: Use the rule to measure each given circle. Use the finest graduation on the rule (64ths) and reduce the dimension to the lowest terms. Make sure that the true diameter is taken by measuring along an axis line. Write the correct diameter in the space provided.



1._____

2._____

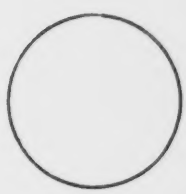
3._____

4._____

5._____

6._____

7._____



8._____

9._____

10. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to LAP Step 18. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 18.

State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO._____ CODE:_____

MAJOR INSTRUCTIONAL AREA

MEASURING

INSTRUCTIONAL UNIT

THE OUTSIDE MICROMETER
SECTION B--UNIT II

LEARNING ACTIVITY PACKET NO.

9

PREREQUISITE LAP(S)

1, 2, 8

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities and performance tasks for "The Outside Micrometer." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training and in achieving a SKILLED or MODERATELY SKILLED competency level in the performance of jobs associated with this specialty.

INTRODUCTION: The course of study in this LAP will help the student become able to use, identify, care for, and read the common types of outside micrometers found in the shop.

TASKS INCLUDED IN THIS LAP:

1. Use the plain micrometer.
2. Use the vernier micrometer.

AUTO MECHANICS I
THE OUTSIDE MICROMETER
Section B--Unit II

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps.

_____1. Read Unit and Specific Objectives, page 51-B.

_____2. Complete The Outside Micrometer Pre-Test, LAP page 5.

_____3. Study The sections of the Information Sheet, pages 57-B through 75-B, indicated by your instructor on your Pre-Test. Be sure to refer to the Transparency Masters when required.

_____4. Refer To Step 9 of your Pre-Test. If additional study is indicated for any of Sections I, II, III, IV, V, or VI, continue to Step 5. Otherwise, proceed to Step 7.

_____5. Do LAP Assignment Sheet #1, LAP page 9.

_____6. Do LAP Assignment Sheet #2, LAP page 11.

_____7. Refer To Step 9 of your Pre-Test. If additional study is indicated for Section VII, continue to Step 8. Otherwise, proceed to Step 11.

_____8. Do Assignment Sheet #1--Read the Plain Micrometer Settings, page 77-B.

_____9. Stop. Have your instructor evaluate Assignment Sheet #1. If your instructor is satisfied with your performance, proceed to Step 11. Otherwise, continue to Step 10.

_____10. Do LAP Assignment Sheet #3, LAP page 13.

_____11. Refer To Step 9 of your Pre-Test. If additional study is indicated for Section VIII, continue to Step 12. Otherwise, proceed to Step 15.

_____12. Do Assignment Sheet #2--Read the Vernier Micrometer Settings, page 79-B.

_____13. Stop. Have your instructor evaluate Assignment Sheet #2. If your instructor is satisfied with your performance, proceed to Step 15. Otherwise, continue to Step 14.

_____14. Do LAP Assignment Sheet #4, LAP page 15.

_____15. Check The tasks below which you feel you can perform without supervision.

Student Check		Instructor Initials/Date	
		Skilled	Moderately Skilled
_____a.	Use the plain micrometer (18).	_____	_____
_____b.	Use the vernier micrometer (24).	_____	_____

_____16. Discuss Your competency in each task with your instructor. Your instructor will initial each task in which you demonstrate sufficient competency. If all tasks have been initialed, proceed to Step 29. Otherwise, continue to Step 17.

_____17. Refer To Step 15a. If this task has been initialed, proceed to Step 23. Otherwise, continue to Step 18.

_____18. Study Job Sheet #1--Use the Plain Micrometer, page 83-B.

_____19. Watch — Slide/Tape presentation "Use the Plain Micrometer" (B-II-1).

_____20. Do — Job Sheet #1--Use the Plain Micrometer.

_____21. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 15a and proceed to Step 23. Otherwise, repeat Steps 18-20 and then go to Step 22.

_____22. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 15a and continue to Step 23. If additional study is required, discuss a program to help you attain sufficient competency with your instructor. Once you have completed that program, have your instructor initial Step 15a and continue to Step 23.

_____23. Refer — To Step 15a. If this task has been initialed, proceed to Step 28. Otherwise, continue to Step 24.

_____24. Study — Job Sheet #2--Use the Vernier Micrometer, page 87-B.

_____25. Do — Job Sheet #2--Use the Vernier Micrometer.

_____26. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 15b and proceed to Step 28. Otherwise, repeat Steps 24 and 25 and then go to Step 27.

_____27. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 15b and continue to Step 28. If additional study is required, discuss a program to help you attain sufficient competency with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 15b and continue to Step 28.

_____28. Refer — To Step 15. If all tasks have been initialed, continue to Step 29. Otherwise, refer to the step indicated in parentheses after the unsigned task.

_____29. Review Information Sheet (page 57-B) and Assignment Sheets 1 and 2.

_____30. Take The Outside Micrometer Unit II Test (see your instructor). If your score is 85 percent or above, continue to the next Learning Activity Packet. If you do not score 85 percent or above, ask your instructor about additional study requirements and possible re-testing.

THE OUTSIDE MICROMETER
UNIT II

PRE-TEST

NAME_____ SCORE_____

DIRECTIONS: This test is to determine how much you already know about the outside micrometer. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you know the answer. Guessing may prevent you from receiving the lessons which are required.

1. Select from the list below the two types of measurements found on outside micrometers by placing an "X" in each correct blank.

   _____a. Conventional measurement -- To the nearest hundredth of an inch.

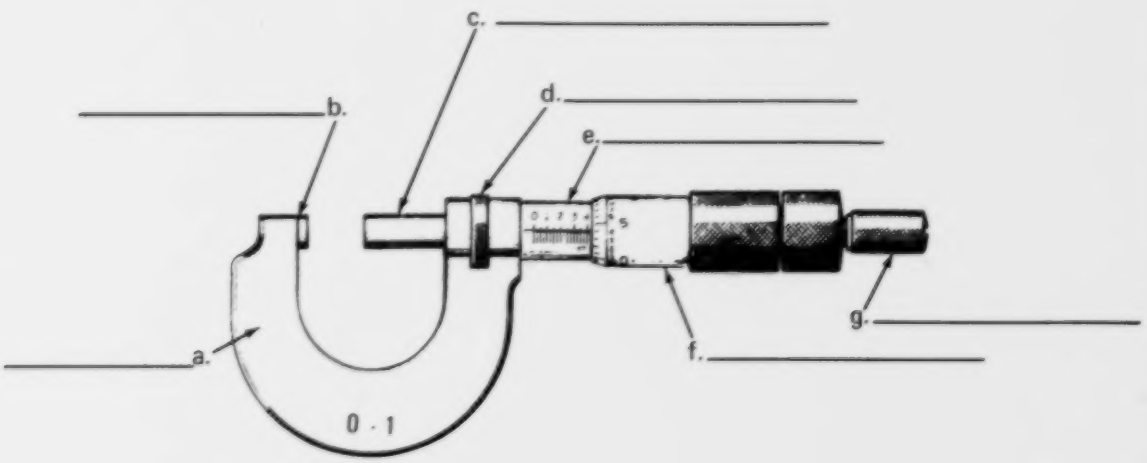
   _____b. Plain measurement -- To the nearest thousandth of an inch.

   _____c. Rule measurement -- To the nearest sixty-fourth of an inch.

   _____d. Universal measurement -- To the nearest tenth of an inch.

   _____e. Vernier measurement -- To the nearest ten-thousandth of an inch.

2. Identify the seven major parts of the outside micrometer in the drawing below by writing the names in the blanks.



3. List two steps in selecting the proper size outside micrometer.

   a.

   b.

4. List seven rules for use and care of micrometers.

   a.

   b.

   c.

   d.

   e.

   f.

   g.

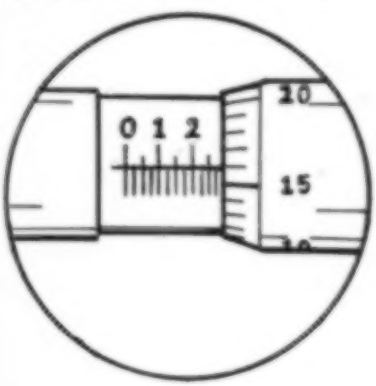
5. Define the term "feel" in using a micrometer.

6. Discuss the methods for checking micrometer accuracy.

   a. The 0" - 1.000" micrometer.

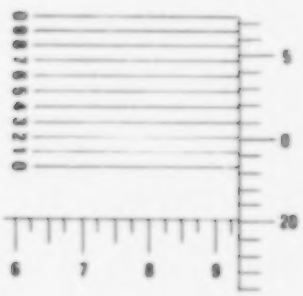
   b. Micrometers larger than one inch.

7. Read the following plain micrometer setting.



Answer _____

8. Read the following vernier micrometer setting.



Answer _____

9. Stop. Have your instructor evaluate your Pre-Test and mark the areas below which require additional study.

Refer to Information Sheet, Sections:

I_____	V_____
II_____	VI_____
III_____	VII_____
IV_____	VIII_____

If any of the above study areas are checked, continue to LAP Step 3. Otherwise, proceed to LAP Step 6.

MEASURING
UNIT I

LAP ASSIGNMENT SHEET #1--THE OUTSIDE MICROMETER

NAME_____ SCORE_____

1. Select from the list below the two types of measurements found on outside micrometers by placing an "X" in each correct blank.

   _____a. Place measurement -- To the nearest hundredth of an inch.

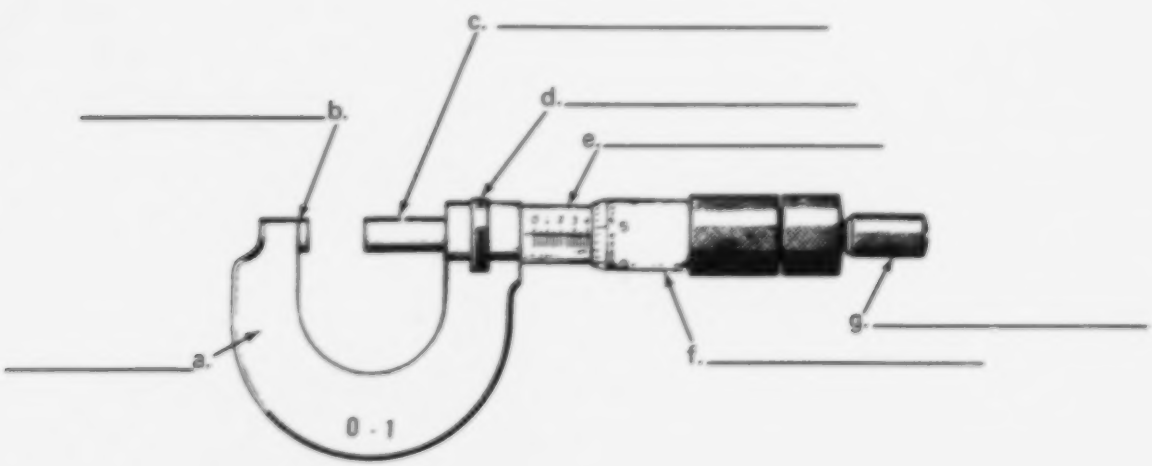
   _____b. Vernier measurement -- To the nearest ten-thousadnth of an inch.

   _____c. Plain measurement -- To the nearest thousandth of an inch.

   _____d. Werner measurement -- To the nearest tenth of an inch.

2. Identify the seven major parts of the outside micrometer in this cutaway picture by selecting the correct name from the list below.

Frame	Ratchet Stop
Lock	Spindle
Thimble	Sleeve
Anvil	



3. List the two steps in selecting the proper size outside micrometer by completing the statements below.

   a. Determine the approximate _____ of the workpiece.

   b. Observe the _____ of the outside micrometer on the frame.

4. List seven rules for the use and care of micrometers by completing the statements below.

   a. Prevent _____ to the micrometer.

   b. Clean and _____ the instrument occasionally.

   c. Check the instrument for _____ before use.

   d. Do not _____ the instrument during measurement.

   e. Keep the instrument and accessories in proper _____ and order.

   f. Handle the instrument in the correct _____.

   g. Use the instrument only for its intended _____.

5. Define the term "feel" in using a micrometer by selecting the correct definition from the choices below.

   _____a. The weight and balance of the micrometer.

   _____b. The amount of resistance in turning the thimble.

   _____c. The exactness for the sense of touch between two people on the same measurement.

   _____d. The exact point of measurement when the micrometer is open to the proper pressure.

6. Discuss methods for checking micrometer accuracy for different sizes of micrometers by completing the two paragraphs below.

   a. For micrometers with a capacity up to 1.000 inch, first close the _____ and _____ together. Check to see if the _____ references on the sleeve and thimble line up.

   b. For micrometers with a capacity of more than one inch, use a standard _____ or _____ to check the minimum capacity. Then check to see if the _____ references on the sleeve and thimble line up.

7. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below which require additional study.

   Refer to Information Sheet, Sections:

   I_____ IV_____

   II_____ V_____

   III_____ VI_____

   If any of the above study areas is checked, study the Information Sheet and continue to LAP Step 6. Otherwise, proceed to LAP Step 7.

MEASURING
UNIT II

LAP ASSIGNMENT SHEET #2--THE OUTSIDE MICROMETER

NAME_____ SCORE_____

1. Select from the list below the two types of measurements found on outside micrometers by placing an "X" in each correct blank.

   _____a. Rule measurement -- To the nearest sixty-fourth of an inch.

   _____b. Universal measurement -- To the nearest ten-thousandth of an inch.

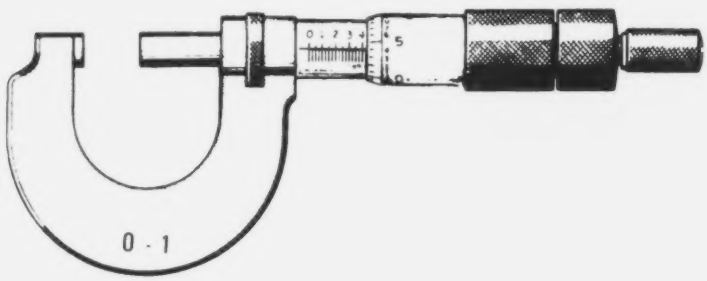
   _____c. Vernier measurement -- To the nearest ten-thousandth of an inch.

   _____d. Conventional measurement -- To the nearest hundredth of an inch.

   _____e. Plain measurement -- To the nearest thousandth of an inch.

2. Identify the seven major parts of the outside micrometer in the figure below by drawing a line from the term to its correct location on the micrometer.

   Ratchet Stop Thimble Sleeve Lock Spindle Anvil Frame



3. List two steps in selecting the proper size outside micrometer by completing the following statements.

   a. Determine the approximate _____.

   b. Observe the _____.

4. List seven rules for the use and care of micrometers by explaining how each one of the following terms applies to the use and care of micrometers.

   a. Damage --

   b. Cleaning and lubrication--

   c. Accuracy--

   d. Overtightening--

   e. Storage--

   f. Handling--

   g. Purpose--

5. Define the term "feel" in using a micrometer by completing the following statement.

   Feel -- Exactness for the _____

   _____

6. Discuss methods for checking micrometer accuracy by listing two steps for each of the following sizes of micrometers.

   a. The 0" - 1.000" micrometer:

      1)

      2)

   b. Micrometers larger than one inch:

      1)

      2)

7. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to LAP Step 7. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 7.

THE OUTSIDE MICROMETER
UNIT II

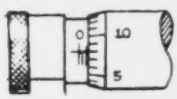
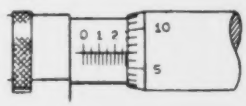
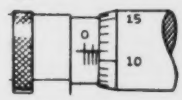
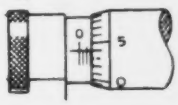
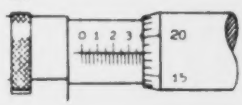
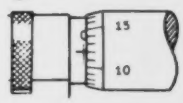
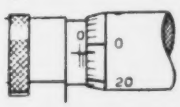
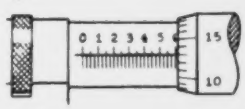
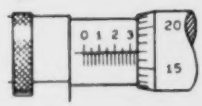
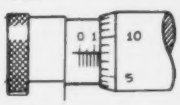
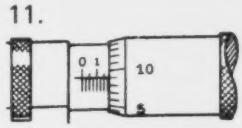
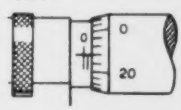
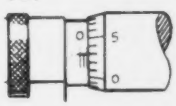
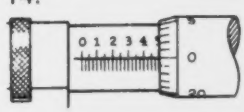
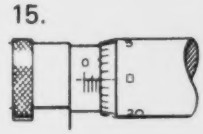
LAP ASSIGNMENT SHEET #3--READ PLAIN MICROMETER SETTINGS

NAME _____ SCORE _____

DIRECTIONS: Read the plain micrometer settings below and write the correct answers in the blanks provided.

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 
12. 
13. 
14. 
15. 

16. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to LAP Step 11. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 11.

THE OUTSIDE MICROMETER
UNIT II

LAP ASSIGNMENT SHEET #4--READ THE VERNIER MICROMETER SETTINGS

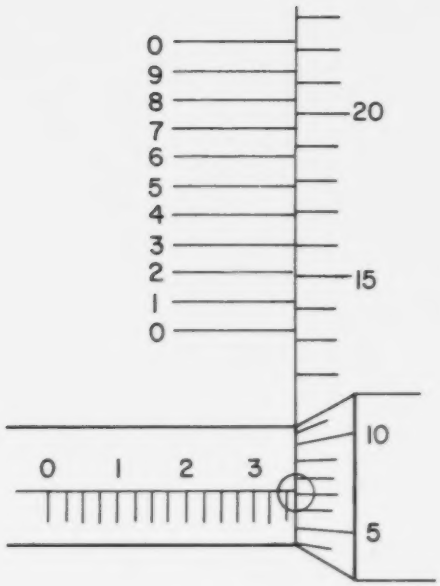
NAME_____ SCORE_____

DIRECTIONS: Read the vernier micrometer settings pictured below and write the correct reading in the space provided beneath each picture.

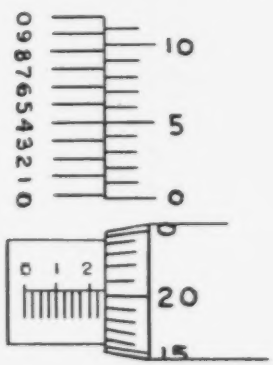
1. a._____

b._____

16



c. _____



d. _____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to LAP Step 15. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 15.

State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO. _____ CODE: _____

MAJOR INSTRUCTIONAL AREA

MEASURING

INSTRUCTIONAL UNIT

THE INSIDE MICROMETER
SECTION B--UNIT III

LEARNING ACTIVITY PACKET NO.

10

PREREQUISITE LAP(S)

1, 2, 8, 9

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities and performance task for "The Inside Micrometer." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training and in achieving a SKILLED or MODERATELY SKILLED competency level in the performance of a job associated with this specialty.

INTRODUCTION: The course of study in this LAP will help the student become able to identify, read, and use the inside micrometer.

TASKS INCLUDED IN THIS LAP:

1. Use the inside micrometer.

AUTO MECHANICS I
THE INSIDE MICROMETER
SECTION B--UNIT III

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps

_____1.	Read	Unit and Specific Objectives, page 97-B.
_____2.	Complete	The Inside Micrometer Pre-Test, LAP page 3.
_____3.	Study	The sections of the Information Sheet, pages 101-B through 115-B, indicated by your instructor on your Pre-Test. Be sure to refer to the Transparency Masters when required.
____4.	Refer	To Step 7 of your Pre-Test. If any of Sections I, II, III, IV, or V are indicated for additional study, continue to Step 5. Otherwise, proceed to Step 7.
_____5.	Do	LAP Assignment Sheet #1, LAP page 7.
_____6.	Do	LAP Assignment Sheet #2, LAP page 11.
_____7.	Refer	To Step 7 of your Pre-Test. If Section VI is indicated for additional study, continue to Step 8. Otherwise, proceed to Step 11.
_____8.	Do	Assignment Sheet #1, Read the Inside Micrometer Settings, page 117-B.
_____9.	Stop.	Have your instructor evaluate Assignment Sheet #1. If your instructor is satisfied with your performance, proceed to Step 11. Otherwise, continue to Step 10.

_____10.	Do	LAP Assignment Sheet #3, LAP page 15.
_____11.	Discuss	Your competency in using the inside micrometer with your instructor. If your instructor feels that you are sufficiently competent in this task, proceed to Step 17. Otherwise, continue to Step 12.
_____12.	Study	Job Sheet #1--Use the Inside Micrometer, page 121-B.
_____13.	Watch	Slide/tape presentation "Use the Inside Micromter" (B-III-1).
_____14.	Do	Job Sheet #1--Use the Inside Micrometer.
_____15.	Stop.	Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, proceed to Step 17. Otherwise, repeat Steps 12-14 and then go to Step 16.
_____16.	Stop	Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, continue to Step 17. If additional study is required, discuss a program to help you attain sufficient competency with your instructor. Once you have completed that program to your instructor's satisfaction, continue to Step 17.
_____17.	Review	Information Sheet (page 101-B) and Assignment Sheet #1.
_____18.	Take	Use the Inside Micrometer Unit III Test (see your instructor). If your score is 85 percent or above, continue to the next Learning Activity Packet. If you do not score 85 percent or above, ask your instructor about additional study requirements and possible re-testing.

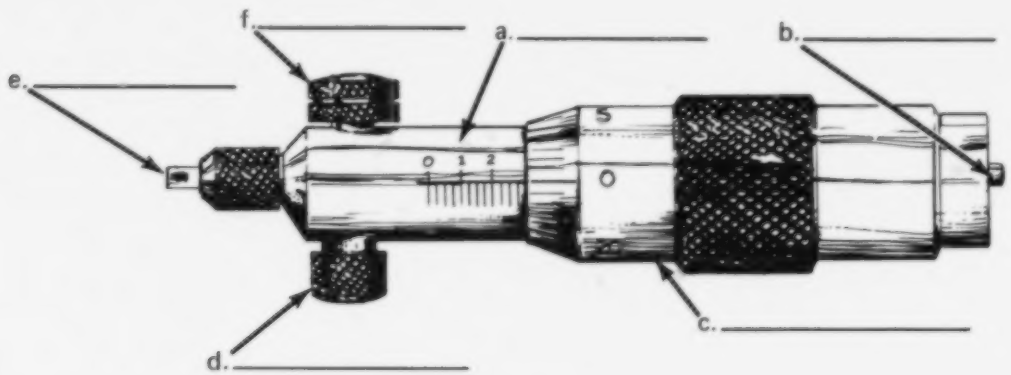
THE INSIDE MICROMETER
UNIT III

PRE-TEST

NAME_____ SCORE_____

DIRECTIONS: This test is to determine how much you already know about the inside micrometer. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you know the answer. Guessing may prevent you from receiving the lessons which are required.

1. Identify the basic parts of the inside micrometer in the drawing below by writing the correct names in the blanks.



2. List four uses of the inside micrometer.

   a.

   b.

   c.

   d.

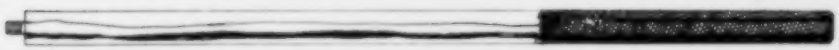
3. Identify the following accessories used with the inside micrometer by writing the correct names in the blanks.

a._____ b._____

4

c. _____

d. _____ e. _____



f. _____

4. List seven rules for use and care of micrometers.

a.

b.

c.

d.

e.

f.

g.

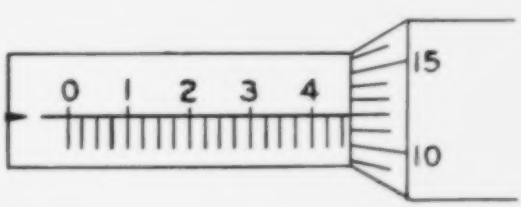
5. List three methods for checking the accuracy of an inside micrometer.

a.

b.

c.

6. Read the following plain micrometer setting.



Answer _____

7. Stop. Have your instructor evaluate your Pre-Test and mark the areas below which require additional study.

Refer to Information Sheet, Sections:

I_____ IV_____

II_____ V_____

III_____ VI_____

If any of the above sections are checked, continue to LAP Step 3. Otherwise, proceed to LAP Step 11.

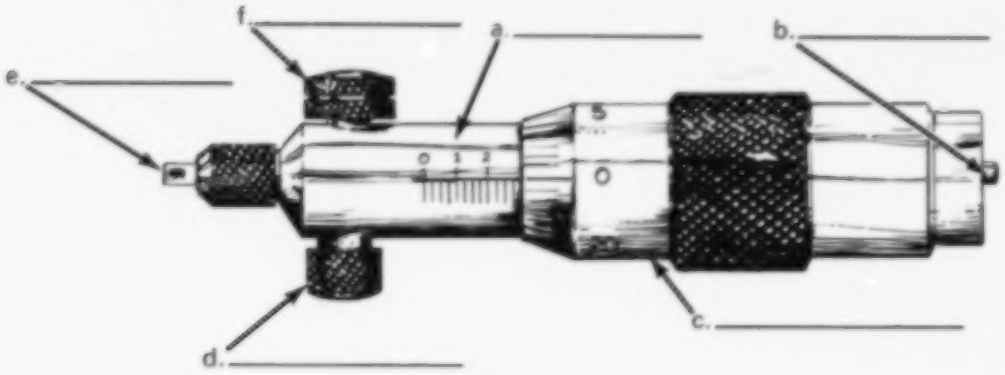
MEASURING
UNIT III

LAP ASSIGNMENT SHEET #1--THE INSIDE MICROMETER

NAME_____ SCORE_____

1. Identify the basic parts of the inside micrometer by writing the correct names from the list below in the proper blanks.

Thimble	Anvil
Rod	Handle
Body	Lock screw



2. List four uses of the inside micrometer by placing an "X" in the blanks beside the correct answers.

_____a. Measure height

_____b. Measure depth

_____c. Transfer measurement to inside spring-joint caliper

_____d. Measure width

_____e. Measure inside radius

_____f. Transfer measurement to outside spring-joint caliper

_____g. Measure thickness

_____h. Measure inside diameter

3. Identify the following accessories used with the inside micrometer by writing the correct names from the list below in the blanks.

Extension collar	Wrench
Base unit	Height gage base
Extension rod	Extension handle

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

4. List seven rules for the use and care of micrometers by completing the following statements.

   a. Prevent _____ to the instrument.

   b. _____ and _____ the instrument occasionally.

   c. Check the instrument for _____ before use.

   d. Do not _____ the instrument during measurement.

   e. Keep the instrument and accessories in proper _____ and _____.

   f. Handle the instrument in the correct _____.

   g. Use the instrument only for its intended _____.

5. List three methods for checking the accuracy of an inside micrometer by completing the following statements.

   a. Measure the _____ reference of an inside micrometer with an accurate outside micrometer.

   b. Measure an object of known accurate measurement or use a standard _____ _____.

   c. Use a gauge block holder and gauge blocks to check an _____ _____ measurement.

6. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below which require additional study.

   Refer to Information Sheet, Sections.

   I_____ IV_____

   II_____ V_____

   III_____

   If any of the above study areas is checked, study that section and then go to LAP Step 6. Otherwise, proceed to LAP Step 7.

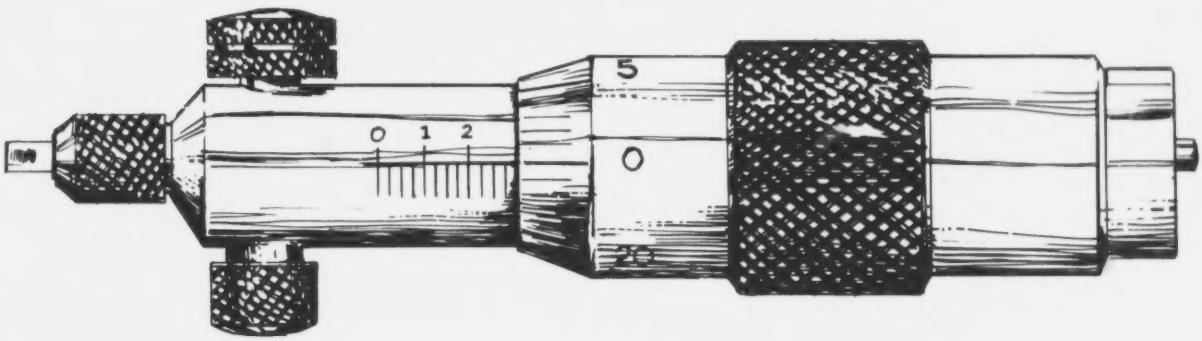
MEASURING
UNIT III

LAP ASSIGNMENT SHEET #2--THE INSIDE MICROMETER

NAME _____ SCORE _____

1. Identify the basic parts of the inside micrometer in the illustration below by drawing a line from the term to its proper location on the micrometer.

   Body Anvil Thimble Handle Rod Lockscrew



2. List four uses of the inside micrometer.

   a.

   b.

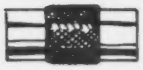
   c.

   d.

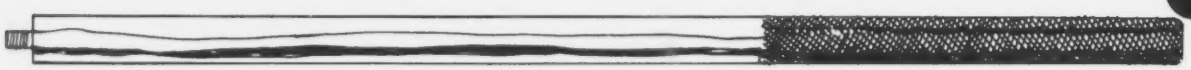
3. Identify the following accessories used with the inside micrometer by completing the name under each drawing.

   a. E _____ R _____

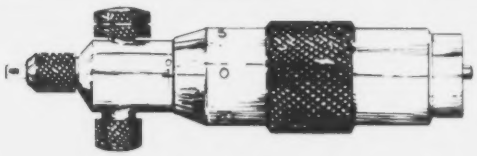
12



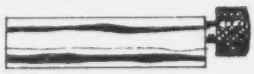
b. E_____ C_____



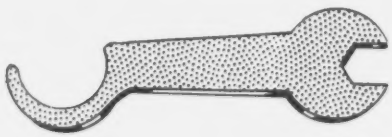
c. E_____ H_____



d. B_____ U_____



e. H_____ G_____ B_____



f. W_____

4. List seven rules for the use and care of micrometers by describing how the phrase given applies to the use and care of micrometers.

   a. Damage --

   b. Cleaning and lubrication --

   c. Accuracy --

   d. Overtightening --

   e. Storage --

   f. Handling --

   g. Purpose --

5. List three methods for checking the accuracy of an inside micrometer by completing the following statements.

   a. Measure the _____ reference of an inside micrometer with an accurate _____ _____.

b. Measure an object of known _____ _____ or use a _____ _____ _____.

c. Use a _____ _____ _____ and _____ _____ to check an _____ _____ measurement.

6. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to LAP Step 7. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 7.

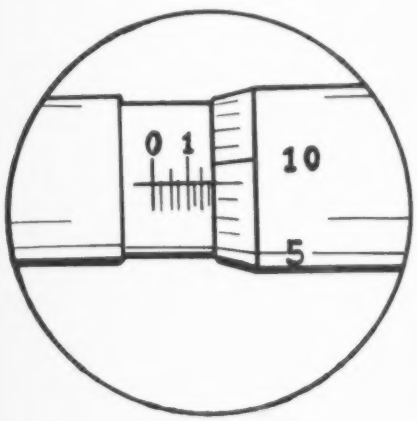
THE INSIDE MICROMETER
UNIT III

LAP ASSIGNMENT SHEET #3--READ THE INSIDE MICROMETER SETTINGS

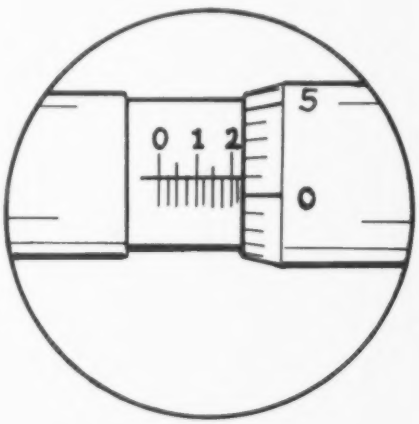
NAME _____ SCORE _____

DIRECTIONS: Read the following inside micrometer settings and record your answer under each picture.

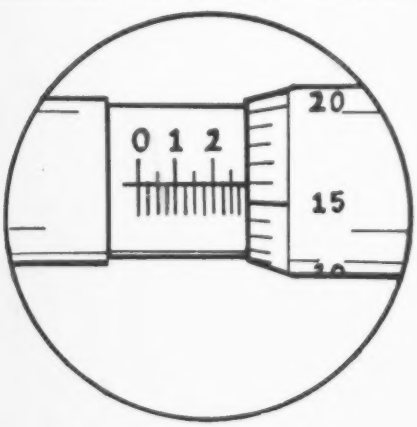
1.



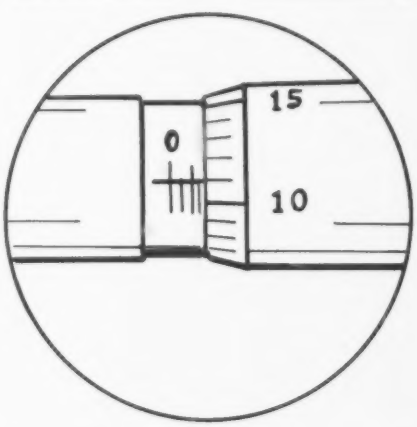
a. _____



b. _____



c. _____



d. _____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your progress, continue to LAP Step 11. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 11.